REMARKS

The specification has been amended to include the provisional application filing date that was not available at the time of filing the present application.

Although claim 7 does not depend upon claim 6 and claim 2, applicants have amended claim 7 to remove any duplicative method steps. Also, the means step in claim 7(f) has been amended to reflect a proper method step. The "second" claim 12 has been canceled while claim 39 has been amended to properly relate to claim 37.

The Examiner states that claims 23, 38 and 50 are substantial duplicates of claims 24, 39 and 51. Applicants respectfully disagree. Claim 23 creates a representation of a utility attribute while claim 24 creates a representation of price versus some attribute. Claim 39 has been amended thereby obviating the objection. Claim 50 creates the representation of the utitility of an attribute of the request while claim 51 creates a representation of the relationship between price of the offer and at least two states of an attribute of an offer. Thus, the above claims are not substantial duplicates of one another.

Claims 19-21 and 46-48 have been rejected as being indefinite. Applicants disagree and provide more information to clarify the invention. For example, claims 19 and 46 use the systems ability to make best matches between buyers and sellers, but does not require that they exchange funds. That is, the same system can be used in market venues such as bartering venues.

Claims 20 and 47 limit the invention by including advertisement of the diverse market protocols supported by the present invention (hereinafter referred to DME), which promotes market-driven evolution of the most efficient and effective protocols for a given market (protocols must be consistently selected, by both buyers and sellers, to be successful). Claims 21 and 48 limit the invention by including advertisement that, for this market, honesty is the best policy.

The rationale for 20 and 21 are included in the specification on pages 23 and 24. Support for claims 46-48 can be found on pages 23 and 24.

Claims 26 and 53 have been rejected as indefinite. Applicants disagree and point out that this clause simply limits the invention to the special case where the requests are employment positions that the buyer wishes to fill, and the offerings are employee attributes of job applicants. Therefore, as a further limitation of prior claims, there is sufficient antecedent basis for the limition in each of these claims.

Claims 1-27 have been rejected as being directed to non-statutory subject matter. Applicants have amended independent claim 1 consistent with the Examiner's suggestion. The rejection should, therefore, be withdrawn.

Claims 1-6 and 28-33 have been rejected in Section 3 of the Office Action as unpatentable over U.S. Patent 6,584,451 to Shoham in view of U.S. Patent 6,012,046 to Lupien, et al. Applicants respectfully disagree.

Regarding claim 1 of the present invention, Shoham does not disclose a general method for representing multiple attributes of a request or an offer. The only attributes that are mentioned by Shoham are price and quantity (which are not even distinguished as attributes). The DME is novel in being able to abstractly represent any quality of the good or service from both the buyers' request and the seller's offer, and to use the aggregate of those quantities to determine the most valuable set of transactions.

The only place Shoham mentions any other attribute is at column 7, lines 45-52 "Information on Quality of Goods." Here, Shoham discussed making product reviews and descriptions available to the buyer. This is very different from the DME formal abstraction of the individual attributes of concern to the buyer, and representation by the seller of the attributes inherent in an offer.

Finally, though Shoham discloses a mechanism for constructing buyer's coalitions, he discloses no way of creating sellers coalitions.

The Examiner relies on on Lupien '046 to cure the deficiencies of Shoham. At column 6, lines 1-3 Lupien specifically limits his invention to LIQUID assets, such as futures, derivatives, options, bonds, currencies, and the like. The method assumes an environment of online traders who are interested in buying financial instruments, and are

willing to create a two-dimensional satisfaction profile reflecting their attitudes about various potential sales. Though Lupien, at column 5, lines 1-6 mentions applying satisfaction density profiles to other variables, he dos not demonstrate how these are incorporated into the 2-dimensional graph that is used throughout the invention. In fact, Lupien's method fails inherently after just a few attribute dimensions, because the user cannot specify or visualize the joint relationships of multiple attributes. (How would the user construct a 4-dimensional density profile?)

In column 18, line 48 through column 19, line 9, Lupien talks about incorporation of "external variables" in the satisfaction density function. What is actually described is a repetition of the satisfaction density function for every state of interest to the trader. This is an extremely cumbersome way to represent a buyer's satisfaction with different potential deals, and Lupien does not disclose the mechanism by which satisfaction with different individual "external variables" are combined to achieve a single valuation of a particular offer.

Though Lupien talks about aggregate satisfaction density profiles as a method of characterizing market metrics, all of the trading mechanisms discussed are, (perhaps conditionally) bilateral trade mechanisms. There is no disclosure of a way, in either Lupien or Shoham, to reconcile different individual traders, who DO NOT agree on a density profile. Thus there is no practical disclosure of construction of coalitions that consider multiple product attributes, and that provide a mechanism for computing assignments which provide the best set of matches for a given market.

Shoham therefore fails as a primary reference and Lupien does not cure the deviciencies in Shoham. Thus, the rejection should be withdrawn.

Regarding claim 2, the Examiner points out that Lupien further discloses:

(a) recording the request and offer data, along with the transaction price and quantity, for the committed transactions, and for other transactions that scored sufficiently well, and for requests and offers that were not matched in the market to store the buyers/sellers

profiles in database which can be used later. (b) inferring (COLLECTING) market value relationships from other data sources, such as sellers' advertisements, and or buyers' requests for proposals; and (c) using of mathematical function approximation techniques for constructing market value functions that describe the relationship between price and the states of various attributes in a hypothetical market. And that it would have been obvious to modify the disclosure of Shoham and include computing a rating for overall satisfaction and determining the best set of matches for a given market to provide a crossing network.

As discussed above, Shoham fails as a primary reference. And while Lupien stores buy and sell density profiles, it does not disclose marking these profiles in terms of committed transactions, versus highly scored transactions, versus offers and requests that found no match. Recording the successful, nearly-successful, and failed transactions is important in providing enough data to learn overall market characterestics.

Lupien speaks of establishing market prices in an auction market for "fungible goods." The DME *does not establish* "market prices." The same good may have different prices for different buyers, depending on how well it satisfies each buyers requirements. Also, the representation of goods as specifications is that they are *not necessarily* fungible. The DME can easily and naturally support a market in which unique products, services, or combinations thereof may be offered. The restriction to fungible goods (which are interchangeable and of equal value) limits other inventions.

Furthermore, Lupien only aggregates the satisfaction density profiles. He does not learn a function relating the price to various attributes in a hypothetical market. Lupien cannot learn this function because his invention does not represent the relation between price and each individual attribute for each transaction (whether successful or not). Having this relationship, the DME is able to use data mining approaches to predict the *likely* market valuation of various attributes and attribute combinations. Note that the predicted market valuations are used as a guide in creating the optimal coalitions, but those bindings are not binding as they would be in a system that actually establishes

market prices. In the DME, the actual binding valuations emerge from the optimization system that finds the market with the highest value.

Shoham and Lupien individually present a very different invention and do not in combination render the present invention obvious. Therefore, the rejection should be withdrawn.

Regarding claims 3 and 4, the Examiner asserts that Shoham teaches aspects of the present invention but does not disclose constructing an artificial negotiating entity that will represent at least one consortium, and can conceal the identities of the buyers in the consortium. Applicants respectfully disagree. The grouping of buyers in Shoham is based purely on willingness to buy a specific good at a particular price. The coalitions of the DME consider not only buyers attitudes with respect to price, but also agreement about other attributes in the specification of the good.

While Shoham does aggregate buyers into clubs to gain price advantages, Shoham uses no abstract representation of the requests which will satisfy each buyer of a consortium. The abstract representation of the DME represents the weighted combination of constraints and value functions for all of the attributes specified by buyers in a given consortium. Matching that abstract representation is, essentially, matching the joint specification for the entire consortium.

Though the systems described by Lupien do offer anonymity to the individual market participants, there is no indication that Lupien's system provides an artificial negotiating entity. Such an entity has value beyond the concealment of identity. For instance, the entity can react to market changes on the behalf of its members in a time interval that would preclude gaining an explicit consensus among all of the members, thus exploiting market opportunities that they could never otherwise enjoy.

Notwithstanding the differences discussed above, there is no suggestion or motivation to combine the capabilities of either Shoham or Lupien to somehow arrive at the present invention. Thus, the rejection should be withdrawn.

Regarding claim 5, Lupien mentions using external variables such as "current

interest rate, quality of the issuer, and coupon rate" to create additional satisfaction density profiles. None of the variables mentioned by Lupien is an extrinsic attribute comprising a transaction or market protocol. Such an attribute in the DME specifies the types of market protocol that a market participant is willing to accept. Once again, Shoham fails as a primary reference and Lupien cannot cure the deficiencies.

Regarding claim 6, the rejection appears incomplete. Nevertheless, although Shoham does aggregate buyers into clubs to gain price advantages, Shoham uses no abstract representation of the requests which will satisfy each buyer of a consortium. The abstract representation of the DME represents the weighted combination of constraints and value functions for all of the attributes specified by buyers in a given consortium. Also, Shoham does not disclose a means to form seller's consortiums. Also lacking from Shoham is a representation of the joint satisfaction of it members with respect to a transaction involving a good or service. Again, the rejection should be withdrawn.

As claims 28-33 have similar limitations of claims 1-6, the rejections should likewise be withdrawn in light of the above remarks.

Claims 7-13, 16, 18, 22-27, 34-40, 43, 45 and 49-56 stand rejected under 35 U.S.C. 103(a) as unpatentable over Shoham and Lupien as applied to claims 1-6 and 28-33, further in view of U.S. Patent 6,141,653 to Conklin.

As discussed previously, Shoham and Lupien fail as primary and secondary references and cannot form the basis for an obviousness rejection. Furthermore, Shoham does not teach building a representation of the attributes that can be satisfied by the same seller offering. To the contrary, coalitions formed by Shoham are based strictly on price.

Conklin cannot cure the deficiencies of Shoham and Lupien. In contrast to the present invention, Conklin's invention is aimed at enabling negotiations, rather than performing market transactions automatically for it users.

The "production purchases" mentioned by Conklin are made with product descriptions, rather than product specifications ("Production purchasing includes the

selection of new vendors, the evaluation of them and their products, conducting contract negotiations, and so on." (See Column 6, lines 5-7).

Finally, Conklin does not teach, disclose or suggest an "artificial negotiating entity." Rather, Conklin provides a secure website, with documentation of all transactions, which permits buyer and seller to negotiate about multiple aspects of a product. Conklin's invention *does not* negotiate on behalf of the buyer or seller, but provides them with a secure channel to propose and alter terms of a negotiated agreement. (See Column 24, lines 1-22 and Column 25, line 12 through Column 26, line 18).

Therefore, the rejection of claim 7 should be withdrawn.

The Examiner rejects claims 8-13 by combining the disclosures of Shoham and Conklin and then adding optimization as taught by Lupien to best attributes which satisfies the transactions beween the sellers and buyers. Not only is there no motivation to combine the above cited references, but the satisfaction density profiles of Lupien are not equivalent to the attribute satisfaction functions of the present invention. Specifically, Lupien does not provide a means to relate any state of any attribute to a particular valuation for that state by the buyer. Because Lupien cannot provide the value, from either the buyer's side or seller's side, of all states of the satisfaction curve for all attributes with which the buyer and or seller is interested, he cannot compute the total market excess value for a particular set of assignments.

While Lupien mentions using linear regression to characterize market size versus spread, this is far different from computing the affect of each attribute on market valuation, as is accomplished by the present invention to learn the composite valuation of every state of attribute satisfaction. Also, Lupien does disclose using optimization to choose allocations, but uses a "greedy search" approach that first makes the highest mutually satisfying allocation, then the next, and so on. Even if Lupien were using the same metric for market value as the present invention (which he is not) this approach does not, in general, provide the market with the highest excess value. Lupien also describes an alternate formulation of the problem, and describes using global

optimization techniques to find allocations for that version, but the alternate formulation is still limited in representing satisfaction density profiles, rather than individual valuations for all states of satisfaction for any number of attributes of interest.

Since each of the three references fail, alone or in combination, to teach, disclose or suggest the present invention, the rejection of claims 8-11 should be withdrawn.

Claims 16 and 18 are generally rejected and it is not clear to the applicants the substance of the rejection. However, applicants maintain that Shoham fails as a reference. Although Shoham discloses data from attempted transactions, he has no way of disclosing data from transactions that scored sufficiently well, as he discloses no mechanism for finding the total market value for a set of transactions. Also, the historical request and offer data of the present invention includes attribute satisfaction valuation, which is extremely useful for market participants in considering future requests or offers with respect to similar goods or services.

Furthermore, Shoham does not disclose use of ontology. An ontology is a database of concepts and relations among those concepts, that permits a conceptualization to move from one system to another, even thought the local terminology within the two systems differs. Shoham does mention finding the "best fit" transaction. (Note that successively finding "best fit" transactions does not produce the highest market value, even if the Shoham were using the same attribute valuation as the present invention).

Although not discussed in the cited references, claims 22-24 are generally rejected because the use of auction protocols would have been obvious and that it would have been obvious to modify the disclosures of Shoham, Lupien and Conklin and add statistical analysis to the predict the success of auction prior to auctioning the goods or service.

In the present invention, the allowable market protocols are extrinsic variables in the termsheets and offersheets, the allowed market protocols themselves affect the valuation of particular attributes of goods or services. The DME is able to learn these valuations, along with the historical and predicted valuations of particular attribute

qualities, for populations of related goods and services, automatically, during continual online analysis of transactions that are optimal, feasible, and infeasible. None of the representations disclosed by Shoham, Lupien, and Conklin provide the generality of (good or service) specification as disclosed by the DME, nor do they use maximum excess value of the market to value sets of transactions, and thus no combination of them can predict the success of an auction, or bid, or offer, for such a market.

Claim 25 stands rejected over Shoham. While Shoham mentions a "buyers interface for receiving a set of optional purchase terms" it does not disclose the mechanism for mathematically relating those terms to the valuation of a good or service. The ability to automatically compute the value of various possible assignments and transactions, and to find the maximum market value, is enabled by the abstract representation of requests and offerings, which is absent from Shoham.

Claim 26 is rejected because, according to the Examiner, it is well known that an agent can request for employment. However, claim 26 is more complex. The key aspect of claim 26 is that it adapts the DME mechanism to analysis job/employment/assignment opportunities. Because of the DME's representation of attributes, satisfaction, and value, it can directly represent the rich complexity of employee's qualities, and employer's specifications. Shoham does not teach, disclose or suggest such limitation nor is it obvious.

Claim 27 is rejected over Shoham. Althoug Shoham mentions goods and services, he provides no mapping between the aspects of tasks (considered as requests, and thus specifications, and represented by termsheets) and the aspects of agents (whether people or software) (considered as offerings, and represented by offersheets). Thus, present claim 27 cannot be considered obvious over Shoham.

Claims 34-40, 43, 45 and 49-54 have similar limitations as claims 7-13, 16, 18 and 22-27 discussed previously. Therefore, the rejection of these claims should likewise be withdrawn.

Claim 55 is rejected over Shoham because it discloses communication of information through the internet by internet protocol messages. Though Shoham teaches the use of the internet to support online shopping, he does not do so in the context of claim 37 of the present invention. In contrast, the present invention provides an improved mechanism for automatic transactions that benefit both buyers and sellers.

Claim 56 is rejected because it is well known to place orders using commonly distributed web browsers. While the use of web browsers for ecommerce is well known, it is novel to use them in conjunction with the system described by the DME.

Claims 14, 15, 17, 41, 42 and 44 are rejected over Shoham, Lupien and Conklin as applied to claims 10 and 37, and further in view of U.S. Patent 6,236,977 to Verba, et al. According to the Examiner, the primary references do not disclose the use of a multagent system to distribut processing over many processors. Applicants disagree.

The *agent population* mentioned in Verba refers to a population of *Real Estate* agents, and not to agents in the sense of *a multi-agent system*, which is a recent distributed artificial intelligence software paradigm that enables robust scaleable decentralized software systems. Verba does mention "market agents that encapsulate a plurality of attributes and operations performed by legal entities" but Verba's description goes on to describe an object-oriented system rather than multi-agent based system. Many of the basic capabilities of a multi-agent system, (which are provided by systems such as DECAF, Zeus, and FIPA-OS) are lacking in Verba's system. (See Column 6, lines 24-53, Verba describes a "virtual agent," implemented within an object-oriented system, that is associated with each user, and supports personalization of the system for that user. Again, this sense of "agent" is far more limited compared with use in the multi-agent programming paradigm.) (See also Column 6, line 38, Verba also states that "the virtual personal assistant handles many of the functions currently handled by human assistants of the (human) real estate agents.")

As stated in the specification of the present invention, "[i]n a preferred embodiment, the software system used to represent and communicate buyers and sellers

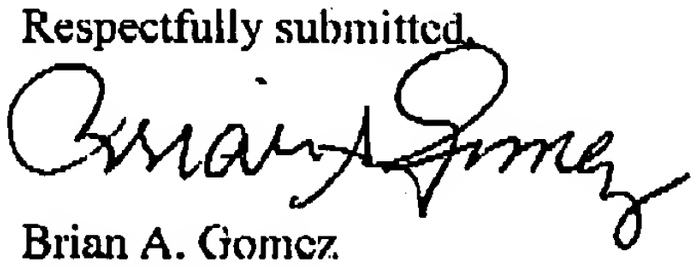
views of the transaction, to find the transactions which maximize the markets excess value, and to provide a means for automatically or interactively achieving agreements to the proposed transactions, and to preserve requisite privacy, anonymity, and legitimacy of market participants, is built using a methodology known as a ***multiagent system***. Multiagent systems are an approach to software architecture that support ***intelligent interaction, scaleability, and robustness, while permitting relatively independent development of component software modules***. Rather than function-call relationships between modules, message-passing conversations are the customary way to describe interaction. ***Each individual agent is capable of responding to a variety of messages, creating agendas to achieve plans, and executing a variety of tasks to achieve those plans.***"

Furthermore, Verba does claim to be performing optimization via application of an adaptive scoring function, but describes a system of score improvement, rather than (comprehensive) score optimization. Finally, the marketing campaigns of Verba do not include the abstract attribute representation of the DME, and have no means of calculating the market value, given such a representation, and no means to maximize the value of such a market by making the best set of allocations.

Claims 41, 42 and 44 have similar limitations of claims 14, 15 and 17 as discussed above. The rejection of these claims should likewise be withdrawn.

In view of the above amendments and remarks, claims 1-56 are considered to represent a novel and unobvious advance in the art. Prompt issuance of a Notice of Allowance for these claims is in order and such action is requested. If any issues remain outstanding, the Examiner is urged to contact the undersigned agent to expedite their resolution.

Respectfully submitted,



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